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Part 1: Architecture

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Partie 1: Architecture

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This third edition cancels and replaces the second edition (ISO/IEC 23006-1:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

— A new reference diagram of an MPEG-M device where the middleware is seen as a black box. ISO/IEC 23006-2 specifies a particular instance of the MPEG-M middleware which is organized in engines.

— High level API exposed by any MPEG-M middleware.

A list of all parts in the ISO/IEC 23006 series can be found on the ISO website.

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Introduction

The ISO/IEC 23006 series has been developed to enable the easy design and implementation of media-handling value chains supported by devices that interoperate because they are all based on the same set of technologies, especially MPEG technologies. The functionalities provided by the MPEG technologies are accessible via application programming interfaces (API).

The ISO/IEC 23006 series specifies a service-oriented architecture (Part 1), middleware API (Part 2), conformance and reference software (Part 3), a set of protocols supporting elementary services (Part 4) and the combination of elementary services into aggregated services (Part 5).

MPEG-M supports the service providers' desire to designed and deploy at reduced cost innovative multimedia services. This is achieved by identifying a set of elementary services (ES) and defining the corresponding set of protocols and APIs to enable any user in an MPEG-M value chain to access those services in an interoperable fashion.

NOTE An MPEG-M value chain is a collection of users, including creators, end users and service providers that conform to the ISO/IEC 23006 series.

In many real-world MPEG-M value chains, service providers would not be able to exploit the potential of the series if they were confined to only offer elementary services. Therefore service providers (SP) will typically offer bundles of ESs, known as aggregated services (AS). In general, there will be a plurality of SPs offering the same or partially overlapping aggregated services. For example, a SP offering user description services, may offer content description services as well.

Starting from ISO/IEC 23006-4, an aggregation of services can put together a number of services generating a complex ISO/IEC 23006 value network, having different topologies and associated services.

Using the ISO/IEC 23006 series, a digital media ecosystem can be established, where:

— developers can offer MPEG-M service components to the professional market because a market will be enabled by the standard MPEG-M component service API;

— manufacturers can offer MPEG-M devices to the global consumer market because of the global reach of MPEG-M services;

— service providers can set up and launch new attractive MPEG-M services because innovative MPEG-M value chains can be easily designed and implemented;

— developers can make available a variety of multimedia applications;

— users can seamlessly create, offer, search, access, pay/cash and consume MPEG-M services.

The ISO/IEC 23006 series extends the devices capabilities with advanced features such as content generation, processing, and distribution by a large number of users; easy creation of new services by combining service components of their choice; global, seamless and transparent use of services regardless of geo-location, service provider, network provider, device manufacturer and provider of payment and cashing services; diversity of user experience through easy download and installation of applications produced by a global community of developers since all applications share the same middleware APIs; and innovative business models because of the ease to design and implement media-handling value chains whose devices interoperate because they are all based on the same set of technologies, especially MPEG technologies.

The ISO/IEC 23006 series is subdivided in five parts:

Part 1 — *Architecture* (the present document): specifies the architecture that can be used as a guide to an MPEG-M implementation;

Part 2 — *MPEG extensible middleware (MXM) API*: specifies the middleware APIs;

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Part 3 — *Conformance and reference software*: specifies conformance criteria and a reference software implementation with a normative value;

Part 4 — *Elementary services*: specifies elementary service protocols between MPEG-M applications;

Part 5 — *Service aggregation*: specifies mechanisms enabling the combination of elementary services and other services to build aggregated services.

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Information technology — Multimedia service platform technologies —

Part 1: Architecture

1 Scope

This document specifies the MPEG-M architecture that is made accessible through the set of MPEG-M high level APIs, MPEG extensible middleware API, elementary services and service aggregation specified in ISO/IEC 23006-2, ISO/IEC 23006-4 and ISO/IEC 23006-5 and as a software implementation in ISO/IEC 23006-3, respectively.

NOTE Annex A provides an informative example of how MPEG-M can be used to create a fully-fledged multimedia platform.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 23000-16, *Information technology — Multimedia Application Format (MPEG-A) — Part 16: Publish Subscribe Application Format*

ISO/IEC 23006-2, *Information technology — Multimedia service platform technologies — Part 2: MPEG extensible middleware (MXM) APIs*

ISO/IEC 23006-3, *Information technology — Multimedia service platform technologies — Part 3: Conformance and reference software*

ISO/IEC 23006-4, *Information technology — Multimedia service platform technologies — Part 4: Elementary services*

ISO/IEC 23006-5, *Information technology — Multimedia service platform technologies — Part 5: Service aggregation*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
application
software that runs in the environment and makes calls to the high-level API

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3.2
computing platform
combination of hardware and basic software, such as operating system and drivers, that executes software

3.3
device
environment that includes software conforming to this specification

3.4
engine
component of the middleware that provides a defined functionality or set of functionalities accessible via API

3.5
environment
combination of hardware and software that exposes high-level API, and interfaces to devices that expose low-level API

3.6
high-level API
abstracted API exposed by a device to enable an application to access its functionalities and services

3.7
low-level API
programmatic interfaces exposed by devices, such as security devices, to the middleware

3.8
middleware
software providing functionalities to local and remote applications

3.9
middleware API
combination of the API of all engines in the middleware

3.10
orchestrator engine
special engine capable of creating chains of engines

EXAMPLE To set-up a sequence of connected engines to execute a high-level API call such as play.

3.11
user
any entity making use of a device

4 Abbreviated terms and elements of the MPEG-M architecture

4.1 Abbreviated terms

API	application programming interface
BPMN	business process model and notation
CEL	contract expression language
DASH	dynamic adaptive streaming over HTTP
DID	digital item declaration

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